

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A monolithically integrated structure combining a field effect transistor and a Schottky structure in an active area of a semiconductor substrate, wherein:

the field effect transistor comprises:

a first trench extending into the substrate and including a conductive material forming a gate electrode of the field effect transistor; and

a pair of doped source regions positioned adjacent to and on opposite sides of the trench and inside a doped body region, the doped source regions forming a source electrode of the field effect transistor, and the substrate forming a drain electrode of the field effect transistor, and

the Schottky structure comprises:

a pair of adjacent trenches extending into the substrate, the pair of adjacent trenches including a conductive material which is separated from trench side-walls by a thin layer of dielectric; and

a Schottky diode having a barrier layer formed on the surface of the substrate and between the pair of adjacent trenches,

wherein the Schottky structure consumes ~~less than 5.0%~~ 0.5-4.5% of the active area, and the field effect transistor consumes the remaining portion of the active area.

2. (Original) The monolithically integrated structure of claim 1 wherein the field effect transistor further comprises a metal layer contacting the pair of doped source regions, the metal layer and the barrier layer comprise one of either titanium tungsten or titanium nitride.

3. (Original) The monolithically integrated structure of claim 2 wherein the barrier layer and the metal layer contacting the source regions connect together by an overlying layer of metal.

4. (Original) The monolithically integrated structure of claim 1 wherein the barrier layer forms the Schottky diode anode terminal and the substrate forms the Schottky diode cathode terminal.

5. (Currently amended) The monolithically integrated structure of claim 1 wherein the integrated structure further comprises a second trench adjacent to the first trench, the second trench ~~forming the gate electrode of the field effect transistor in a similar fashion to the first trench~~ including a conductive material coupled to the conductive material in the first trench, wherein a distance between the first trench and the second trench is greater than a distance W separating the pair of adjacent trenches, and wherein the barrier layer and a metal layer contacting the source regions of the field effect transistor comprise one of either titanium tungsten or titanium nitride.

6. (Currently amended) The monolithically integrated structure of claim 1 wherein the conductive material in the first trench ~~and second trenches~~ electrically connects to the conductive material in the pair of adjacent trenches between which the Schottky diode is formed.

7. (Currently amended) The monolithically integrated structure of claim 1 wherein the conductive material in the pair of adjacent trenches between which the Schottky diode is formed is electrically isolated from the conductive material in the first trench ~~and second trenches~~.

8. (Original) The monolithically integrated structure of claim 1 wherein the conductive material in the pair of adjacent trenches between which the Schottky diode is formed, is recessed into the pair of adjacent trenches and covered by a layer of dielectric material.

9. (Original) The monolithically integrated structure of claim 1 wherein the first trench has a thicker insulating layer along its bottom than along its sidewalls.

10. (Original) The monolithically integrated structure of claim 1 wherein each of the pair of adjacent trenches and the first trench has a thicker dielectric layer along its bottom than along its sidewalls.

11. Canceled

12. Canceled

13. (Currently amended) ~~The~~ A monolithically integrated structure ~~of claim 1~~ wherein ~~each of the first trench and the pair of adjacent trenches includes one or more conductive electrodes beneath the conductive material~~ combining a field effect transistor and a Schottky structure in an active area of a semiconductor substrate, wherein:

the field effect transistor comprises:

a first trench extending into the substrate;

a first conductive material forming a shield electrode in a bottom portion of the first trench;

a second conductive material forming a gate electrode in the first trench, the second conductive material being over but insulated from the first conductive material;

a pair of doped source regions positioned adjacent to and on opposite sides of the trench and inside a doped body region, the doped source regions forming a source electrode of the field effect transistor, and the substrate forming a drain electrode of the field effect transistor, and

the Schottky structure comprises:

a pair of adjacent trenches extending into the substrate, each of the pair of adjacent trenches including a first conductive material over but insulated from a second conductive material; and

a Schottky diode having a barrier layer formed on the surface of the substrate and between the pair of adjacent trenches,
wherein the Schottky structure consumes 0.5-4.5% of the active area, and the field effect transistor consumes the remaining portion of the active area.

14. (New) The monolithically integrated structure of claim 13 wherein the field effect transistor further comprises a metal layer contacting the pair of doped source regions, the metal layer and the barrier layer comprise one of either titanium tungsten or titanium nitride.

15. (New) The monolithically integrated structure of claim 14 wherein the barrier layer and the metal layer contacting the source regions connect together by an overlying layer of metal.

16. (New) The monolithically integrated structure of claim 13 wherein the barrier layer forms the Schottky diode anode terminal and the substrate forms the Schottky diode cathode terminal.

17. (New) The monolithically integrated structure of claim 13 further comprising a second trench adjacent to the first trench, the second trench including a third conductive material forming a shield electrode and a fourth conductive material forming a gate electrode over but insulated from the third conductive material, wherein a distance between the first trench and the second trench is greater than a distance W separating the pair of adjacent trenches, and wherein the barrier layer and a metal layer contacting the source regions of the field effect transistor comprise one of either titanium tungsten or titanium nitride.

18. (New) The monolithically integrated structure of claim 13 wherein lower sidewalls and bottom of the first trench is lined with a shield dielectric, and upper sidewalls of the first trench are lined with a gate dielectric, the shield dielectric being thicker than the gate dielectric.